Claims

1. A universal method of establishing a continuous, mutual correlation between sound and light, comprising the steps of:

- inputting at least one wavelength, wavelength of light (λ_p), r and/or wavelength of sound (λ_s);

- calculating the corresponding wavelength of sound and/or light using the equation:

$$\left(\frac{a}{r}\right)\frac{\lambda_s^{\ m}}{\lambda_p^{\ n}} = k$$

- outputting the calculated wavelength;

wherein, k is the only consistent correlation number that is unique among all wavelength combinations of note sounds and colors and reveals a continuous, seamless, and mutual correlation between light and sound, and related to a ratio of light and sound velocities, a is a term that relates sound wavelengths to an octave system, r is a number that represents the perceived brightness of light, and m and n are powers between $0.2 \leq m \leq 2$ and $0.2 \leq n \leq 2$.

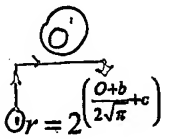
2. The method of claim 1, if λ_s is an input, further comprising the steps of:

- checking whether O' is an input (102);

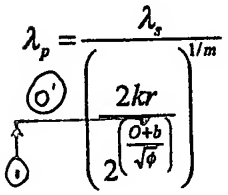
- if O' is not an input, calculating O' from the equation (103):

$$\overset{\textcircled{2}}{O'} = \operatorname{int}\left(\log\left(\frac{d}{\lambda_s}\right)/e\right)$$

- calculating r from O' using the equation (104):



- then calculating the corresponding wavelength of light using the equation (105):

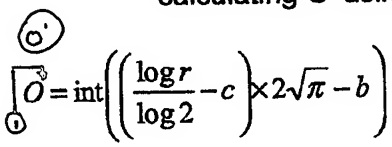


- outputting the calculated wavelength of light (λ_p), r (106);

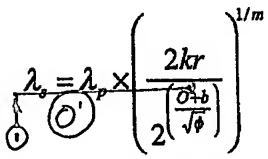
wherein the b, c, d, and e are numbers $-5 \le b \le 5$, $-2 \le c \le 2$, $0.05 \le d \le 40$, $0.1 \le e \le 1$, and ϕ is the Golden Ratio.

3. The method of claim 1 or 2, if λ_p, r are inputs, further comprising the steps of:

- calculating O' using the equation (107):



- then calculating the corresponding wavelength of sound using the equation (108):



- outputting the calculated wavelength of sound (λ_s) and O' (106).

4. A mutual sound and light correlation apparatus exploiting said method according to any one of claims 1 to 3, characterized in that it is a device capable of performing said calculations of the method, and outputs the

wavelength of sound and/or light when any wavelength of light and/or sound is input along with other relevant data.

5. An apparatus according to claim 4, characterized in that the inputs are realized through an input interface comprising a keyboard, a keypad, a mouse, a device measuring wavelength of sound and/or light, a touch-screen, a graphics interface, sensor, measurement device etc.
6. An apparatus according to claim 4 and 5, characterized in that the outputs are realized through an output interface comprising any sound and/or light generator and/or graphics generator.
7. An apparatus according to claims 4 to 6, in the form of a continuous color and sound correlation display apparatus, wherein all wavelengths in the audible sound range are correlated with light wavelengths on several layers of the visible light gamut such that a layer is constructed for each octave with corresponding perceived brightness, and then these layers are superimposed, on which a user may point physically or electronically to a color to hear and/or read the correlating sound, or may point physically or electronically to a sound to see and/or read the correlating color, wherein the color and sound correlation is displayed in at least two dimensions.
8. An apparatus according to claim 7, characterized in that said continuous light and sound correlation is displayed by this apparatus attached to any music instrument.

9. An apparatus according to claims 4 to 6, in the form of a color and sound correlation slide rule apparatus (50), which comprises at least a stationary part (51) on which at least one variable of the light and sound correlation, i.e. colors or notes, is labeled and/or generated and at least a movable part (56), which moves relative to the stationary part(s) on which at least one of the other variables is labeled and/or generated and at least one correlating variable is displayed.
10. An apparatus according to claim 9, characterized in that said parts are in the form of any three-dimensional object wherein the relative motion between parts is linear and/or rotational.
11. An apparatus according to claim 9 or 10 characterized in that parts (51 and 56) are in the form of concentric circular disks, placed such that the moving part rotates on the stationary part and that it comprises at least one thumb lever (54) on the rotating part (56), and a pointer (52) on the stationary part, such that, when the rotating part is aligned with the pointer on the stationary part, the corresponding variable can be seen at a reference point.
12. An apparatus according to claim 11, characterized in that said reference point is a window (55) on the rotating part, which shows the color correlating to the musical note on the rotating part (56) in front of the pointer.
13. An apparatus according to claims 4 to 6, in the form of a CMIDI (Color Musical Instrument Digital Interface) file generating apparatus, which receives an array of instrument and sound information per any time interval (61), next, checks

whether the sound information includes wavelength of sound (62), then if said information is absent, calculates wavelength of sound from the present information (63), then inputs each wavelength of sound into the light and sound correlation apparatus (64), which in turn calculates wavelength of light and perceived brightness, r, which information is arranged in the form of a data array, preferably a CMIDI file (65) which is in turn transferred to any storage or retrieval, printing, transmitting, display or animation device, depending on the desired form of output (66).

14. An apparatus according to claims 4 to 6, in the form of a visual orchestration apparatus (80) comprising functions as a means of:

- digitally defining a given or arranged instrument layout depending on instruments in a performance, composition, or sound sources (85);
- developing a CMIDI file or data array compiled from a given performance, composition, or sound sources (81) using the above explained CMIDI file generating apparatus (82), wherein the data array includes spatial information of instruments or sound sources on the layout;
- transferring the generated CMIDI file to the instrument layout (83);
- outputting the orchestration in the form of frames sequenced for each time increment wherein the colors of each sound are displayed (84).

15. An apparatus according to claims 4 to 6, for composing music for a given artwork, photograph, image, piece of art etc. (121), which discretizes said image into small surface area fragments (grids) (122) such that the

discretization grid has at least two dimensions wherein one dimension corresponds to the time frame and the other dimensions correspond to the instrument layout in the orchestra, then for each grid surface area, calculates color information (123), then inputs this information into the light sound correlation apparatus (124) which in turn outputs the corresponding wavelength of sound for a given grid, and outputs the sound data in any suitable file format such as MIDI, mp3, etc. (127).

16. An apparatus according to claim 15, characterized in that if visual orchestration is also requested (125), wavelength of sounds is input into the visual orchestration apparatus (126).

17. An apparatus according to claims 4 to 6, which derives spatial information according to the shades of colors that change with depth, and as the user, moves the pointer (131) across the image (132) of the three dimensional object, calculates the wavelength of light at every point of the image, simultaneously inputs this data into the light sound correlation apparatus, and plays the generated sound data using any sound generation apparatus (133) such as loudspeakers, etc.

18. An apparatus according to claim 17, characterized in that it is in the form of a physical three-dimensional object, which is covered with a network of color coded pressure sensors, such that as the user touches the object and moves his finger on the object, a correlating sound is generated to inform him/her about the depth of the object.

19. An apparatus according to claim 18, characterized in that it is in the form of an elastic blanket to be wrapped on various other objects the user might like to recognize by the light and sound correlation.

20. An apparatus according to claims 4 to 6, characterized in that it receives live or recorded AV input in any format (141) from two identical channels (142), uses one signal to arrange the instrument layout (143) and forwards that signal to the visual orchestration apparatus (144), wherein the visual orchestration output in this channel is sent as a second AV input to any AV apparatus with picture in picture capability (145) and the second input signal is forwarded 'as is' to the same AV apparatus where this original signal is displayed as the main AV picture, whereas the colorized AV signal is simultaneously displayed in the picture in picture AV frame (145).